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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,304	07/18/2003	Steven A. Rosenau	10021074-1	3428

7590 08/09/2004

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EXAMINER	
ANDUJAR, LEONARDO	

ART UNIT	PAPER NUMBER
2826	

DATE MAILED: 08/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/623,304	ROSENAU ET AL.	
	Examiner	Art Unit	
	Leonardo Andújar	2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 June 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *22-30* is/are allowed.

6)☒ Claim(s) *1-4,6-9,12-14,16-19 and 21* is/are rejected.

7)☒ Claim(s) *5,10,11,15 and 20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of species 9 (claims 1-30) in the reply filed on 05/04/2004 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-4, 6-9, 12-14, 16-19 and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Wang et al. (US 6,444,921).

4. Regarding claim 1, Wang (e.g. figs. 3 & 5) teaches a circuit interconnect 30 comprising: a substrate 32 having a fold at the first end of the interconnect (i.e. the end adjacent to the right fold); and a conductor layer supported by the substrate, the conductor layer comprising a transmission line 33 and a pad array of a grid array interface 24 adjacent to the first end, the transmission is connected to a pad of the pad array. Also, the fold is between a first portion (i.e. top surface) and a second portion of

the interconnect (i.e. bottom surface) such that the first portion is essentially parallel to the second portion along a length of the interconnect extending away from the fold.

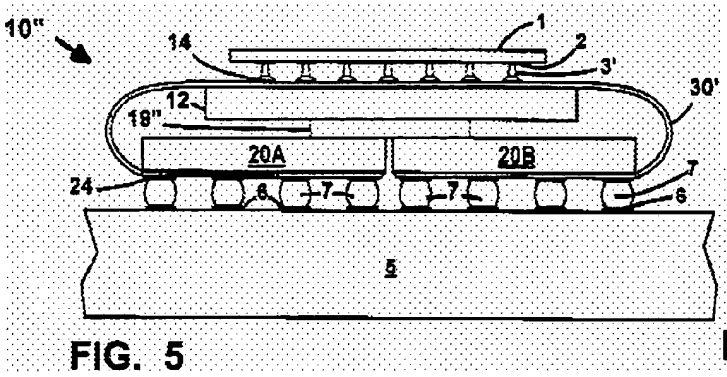


FIG. 5

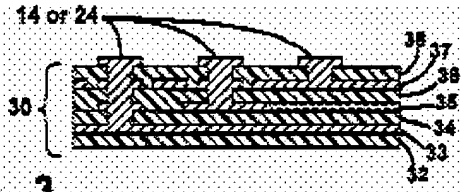


FIG. 3

5. In reference to the claim language referring to the function of the electrical traces such as "a high frequency transmission line", intended use and other types of functional language must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. For instance, a copper layer is capable of transmitting a high frequency signals (col. 6/lls. 44-47). In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. *In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963).*

6. Regarding claim 2, Wang teaches that the substrate is made of a flexible material (col. 6/lls. 39-56).

7. Regarding claim 3, Wang shows that the pad array is an array of interconnection pads (e.g. fig. 3). The pad array is a portion of the grid array interface, which is a ball grid array (e.g. fig. 6).

8. Regarding claim 4, Wang teaches a stiffener 20 (e.g. copper) that supports the substrate (col. 7/lls. 64-65). The stiffener is between the first portion and the second portion adjacent to a surface of the substrate opposite to a surface that supports the transmission line and the pad array between the first and second portions

9. Regarding claim 6, Wang shows an electrical interface 14 adjacent to a second end (i.e. the end adjacent to the left fold). Moreover, the electrical interface 14 is adjacent to both ends in the embodiment depicted in figure 5.

10. Regarding claim 7, Wang teaches that the pad array and the electrical interface are adjacent to a surface of the substrate exterior to a space between the first and second portion. The pad array is on the first portion of the interface and the electrical interface is on the second portion.

11. Regarding claim 8, Wang teaches a conductor layer 20 (e.g. copper) supported by a surface of the substrate interior to the space between the first and second portions (col. 7/lls. 64-65).

12. Regarding claim 9, Wang teaches that the electrical interface is a portion of a pin grid array.

13. Regarding claim 12, Wang teaches that the substrate has another fold at a second end of the interconnect. The second end being opposite to the first end, such that the first portion and the second portion are between the folds. Also, the substrate essentially forms a loop

14. Regarding claim 13, Wang (e.g. figs. 5 and 3) shows a folded flex circuit interconnect 30 comprising: a flexible substrate 32 having a fold at a first end of the

interconnect (i.e. the end adjacent to left fold) and second fold at a second end of the interconnect opposite the firs end (i.e. the end adjacent to right fold); and a conductor layer supported by the substrate, the conductor layer compromising one or more electrical traces 33 and a pad array of a grid array interface 24, the pad array being adjacent to the first end and connected to one or more of the electrical traces, wherein a first portion (i.e. top surface) and a second portion of the interconnect (i.e. bottom surface) are between the first fold and the second fold such that the first portion is essentially parallel to the second portion and the substrate essentially forms a loop.

15. Regarding claim 14, Wang shows electrical traces 33. In reference to the claim language referring to the function of the electrical traces such as "a transmission line that supports one or both microwave and millimeter wave signal propagation", intended use and other types of functional language must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. For instance, a gold layer is capable of transmitting a microwave signal (col. 6/lls. 44-47). In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. *In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963).*

16. Regarding claim 16, Wang shows that the substrate and conductor layer are fabricated as essentially planar structure having two separated termination ends, the structure being subsequently folded such that the two separated termination ends are

brought together *in proximity to one another* to form the interconnect (see also fig. 19). In this case, the phrase "*in proximity to one another*" can be interpreted as to be close other but not necessary in contacting each other.

17. Regarding claim 17, Wang shows an electrical interface 14 adjacent to a second end of the interconnect (i.e. the end adjacent to right fold) and electrically connected to the electrical traces. Moreover, the electrical interface 14 may be adjacent to both ends in the embodiment depicted in figure 5.

18. Regarding claim 18, Wang teaches that the pad array and the electrical interface are adjacent to a surface of the substrate exterior to a space between the parallel first and second portions. The pad array is in the first portion and the electrical interface is at the second portion.

19. Regarding claim 19, Wang shows that the gird array interface is a ball grid array and the electrical interface is a portion of a pin grid array.

20. Regarding claim 21, Wang shows that conductor layer further comprises another electrical interface (the ball grid array below the substrate 20B) between the first and second end of the interconnect. The other interface is connected to the electrical traces.

Allowable Subject Matter

21. Claims 22-30 are allowed. Claims 5, 10, 11, 15 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

22. The following is an examiner's statement of reasons for allowance: with respect to claims 11, 20 and 22 the prior art does not show or cannot be fairly combined to render obvious circuits elements (e.g. optical unit and motherboard) interconnected by an interconnection substrate without being stacked. Regarding claims 5, 10 and 15, the prior art does not show or cannot be fairly combined to render obvious an interconnect substrate having a bend that changes an orientation of the first end relative to a second end.

23. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

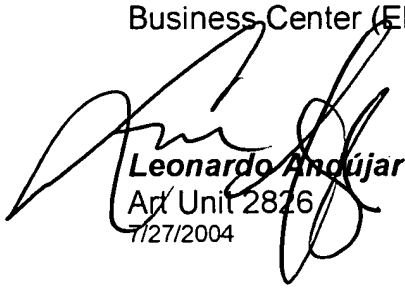
Conclusion

24. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nicewarner (US 5,776,797) and Nakatsuka (US 6,208,521) show a flexible substrate similar to the instant invention.

25. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonardo Andújar whose telephone number is 571-272-1912. The examiner can normally be reached on Mon through Thu from 9:00 AM to 7:30 PM EST.

26. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

27. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Leonardo Andújar
Art Unit 2826
7/27/2004